

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1. (currently amended) A rolling element which is made from a steel material which ~~contains at least~~ comprises 0.5 to 1.5 wt% carbon and 0.2 to 2.0 wt% of one or more alloy elements selected from the group consisting of V, Ti, Zr, Nb, Ta and Hf; and in which 0.4 to 4.0 % by volume of one or more compounds selected from the group consisting of carbides, nitrides and carbonitrides of said alloy elements, and having an average particle diameter of 0.2 to 5 μm are dispersed,

wherein the soluble carbon concentration of a martensite parent phase of a rolling contact surface layer is adjusted to 0.3 to 0.8 wt%, the martensite parent phase having been subjected to induction hardening and low temperature tempering, and

wherein one or more of said carbides, nitrides and carbonitrides are dispersed in an amount of 0.4 to 4.0% by volume within the martensite parent phase.

Claim 2. (currently amended) The rolling element according to claim 1, wherein 2 to 15% by volume of cementite particles containing 2.5 to 10wt% Cr as an average composition disperse in the martensite parent phase of the rolling contact surface layer.

Claim 3. (original) The rolling element according to claim 2, wherein prior austenite grains in a quench hardened layer are fined to have a particle size equal to or greater than the level of ASTM No. 10 and wherein the amount of retained austenite is adjusted to 10 to 50% by volume.

Claim 4. (currently amended) The rolling element according to claim 1, wherein said steel material ~~contains~~ further comprises 0.5 to 3.0 wt% Si, 0.20 to 1.5 wt% Al or 0.5 to 3.0 wt% (Si + Al), and ~~further contains~~ one or more elements selected from the group consisting of Mn, Ni, Cr, Mo, Cu, W, B, and Ca, unavoidable impurity elements such as P, S, N and O, and the balance substantially consisting of Fe.

Claim 5. (currently amended) The rolling element according to claim 4, wherein steel material further comprises 0.3 to 1.5 wt% Ni ~~is added to said steel material containing~~ 0.2 wt% or more Al.

Claim 6. (original) The rolling element according to claim 5, wherein cementite and retained austenite disperse in a quench hardened layer of the steel material.

Claim 7. (currently amended) The rolling element according to claim 4, wherein said steel material ~~at least contains~~ further comprises 0.3 to 1.5 wt% Cr and ~~further contains~~ one or more alloy elements selected from the group consisting of 0.2 to 1.5 wt% Mn; 0.5 wt% or less Mo; and 0.5 wt% W or less.

Claim 8. (original) The rolling element according to claim 7, wherein cementite and retained austenite disperse in a quench hardened layer of the steel material.

Claim 9. (currently amended) The rolling element according to ~~any one of claims~~ claim 1 ~~[[to 8]]~~, wherein the rolling contact surface layer is quench hardened by induction hardening in which rapid cooling is carried out after rapid induction heating is done within 10 seconds in the temperature region of the A1 temperature of the steel material to a quenching temperature of 900 to 1050°C.

Claim 10. (original) The rolling element according to claim 9, wherein the quench hardened layer is formed along the contour of teeth by quenching subsequent to the induction heating.

Claim 11. (currently amended) The rolling element according to claim 1, which is a gear used under a slipping condition and wherein a compressive residual stress of at least 50 kgf/[[mm²]] mm² or more remains at the roots of the teeth.

Claim 12. (currently amended) The rolling element according to claim 11, wherein the compressive residual stress is generated

by mechanical means ~~such as shot peening~~.

Claims 13 to 19. (canceled)

Claim 20. (currently amended) A method of producing a rolling element from a steel material which ~~contains at least~~ comprises 0.5 to 1.5 wt% carbon; 0.3 to 1.5 wt% Cr; and 0.2 to 2.0 wt% of one or more alloy elements selected from the group consisting of V, Ti, Zr, Nb, Ta and Hf; and in which 0.4 to 4.0 % by volume of one or more compounds selected from the group consisting of carbides, nitrides and carbonitrides of said alloy elements, and having an average particle diameter of 0.2 to 5 μ m and 7.5 to 20 % by volume of cementite are dispersed,

wherein the soluble carbon concentration of a martensite parent phase of a rolling contact surface layer, which has been subjected to induction heating quenching and low temperature tempering, is adjusted to 0.3 to 0.8 wt% and

wherein 0.4 to 4.0% by volume of one or more of said carbides, nitrides and carbonitrides and 2 to 15% by volume of cementite are dispersed within the martensite parent phase.

Claim 21. (currently amended) The method of producing a rolling element according to claim 20, wherein by use of a steel material in which the Cr concentration of the cementite has been adjusted to 2.5 to 10 wt% and which has been subjected to a thermal treatment for spheroidizing the cementite, the soluble carbon concentration of the martensite parent phase is adjusted to 0.35 to 0.8 wt%, 2 to 15 % by volume of granular cementite having an average particle diameter of 1.5 μm or less is dispersed in the parent phase, and 10 to 50% by volume of retained austenite is formed.

Claim 22. (currently amended) The method of producing a rolling element according to claim 21, wherein said induction heating/quenching of the rolling contact surface layer of the invention is performed such that rapid cooling is carried out subsequently to rapid heating in which the temperature of the steel material is raised from its A1 temperature to a quenching temperature of 900 to 1050[[]] °C within 10 seconds.

Claim 23. (currently amended) The method of producing a rolling element according to claim 22, wherein said induction heating/quenching is performed such that an induction-hardened-contour gear having a quench hardened layer formed along the contour of teeth is produced with ~~[[the]]~~ a speed of heating at least from the A1 temperature to said quenching temperature ~~[[set]]~~ being to 150~~[[?]]~~°C/sec or more.

Claim 24. (canceled)

Claim 25. (currently amended) The method of producing a rolling element according to ~~any one of claims~~ claim 20 ~~[[to 24]]~~ , wherein the compressive residual stress of the rolling contact surface layer is increased by mechanical means ~~such as shot peening~~.

Claim 26. (new) The rolling element according to claim 12, wherein the mechanical means comprises shot peening.

Claim 27. (new) The rolling element according to claim 25, wherein the mechanical means comprises shot peening.